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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,854	07/09/2003	Chunlin Liang	42P4214D2	1793

8791 7590 08/20/2004

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EXAMINER

PHAM, THANH V

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/616,854

Applicant(s)

LIANG ET AL. 

Examiner

Thanh V Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to *amended* claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

### *Response to Amendment*

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim US 6,001,685 in combination with Schrantz et al. US 5,683,939 (provided by applicant).

Re claims 1, 5 and 8, the Kim reference discloses a method of forming a semiconductor structure comprising: forming a transistor structure, fig. 6A, in an active area of a semiconductor substrate 21, said transistor structure including a gate 24 on said substrate, said gate having a top surface and opposing side surfaces, first dielectric spacer portions 27 adjacent said top surface and said opposing side surfaces, and diffusion regions 26/26' in said substrate adjacent said gate; and depositing a thermally conducting non-electrical conducting material 30/34 on said transistor structure, fig. 6F.

The Kim reference teaches substantially all of the instant invention as in the above but lacks the use of thermally conducting non-electrical conducting material <sup>having</sup> ~~has~~ a thermal conductivity greater than 0.185 W/cmK and selected from the group consisting of AlN, BN, SiC, CVD diamond.

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The Schrantz et al. reference discloses use of diamond films for forming interlevel dielectrics to utilize the high thermal conductivity (background and description of the preferred embodiments), the thermal conductivity of diamond is 12-23 W/cmK as provided by the instant specification's table 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply diamond films for forming interlevel dielectrics as the diamond film would be selected in accordance with the method of Kim in order to utilize the high thermal conductivity for dissipation of heat generated at localized sources as taught by Schrantz et al. (col. 1, lines 23-27).

Re claims 2 and 6, the Kim's method further comprising the step of patterning a contact 32'/35' to at least one of said diffusion regions, fig. 6G.

Re claims 3 and 7, wherein said patterned contact has a top surface and a plurality of exposed side surfaces, and wherein after the step of patterning said contact to one of said diffusion regions, the method further comprises forming a second spacer portion 38 of dielectric material, col. 7, lines 5-6, adjacent to at least one of said exposed side portions of said contact.

Re claim 4, the Kim's method further comprising the step of depositing a thermal conducting material 40 over said top surface of said contact, fig. 6H.

***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-T (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TwP  
TvP  
08/17/04

  
George Fourson  
Primary Examiner